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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/696,809	10/30/2003	Richard G. Hoffman II	004578.1379	1299

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EXAMINER	
ALSOMIRI, ISAM A	
ART UNIT	PAPER NUMBER
3662	

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	04/10/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 04/10/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTOmail3@bakerbotts.com
PTOmail4@bakerbotts.com

Office Action Summary	Application No.	Applicant(s)	
	10/696,809	HOFFMAN, RICHARD G.	
	Examiner	Art Unit	
	Isam Alsomiri	3662	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 March 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4,6,8-14,16,18 and 20-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,6,8-14,16,18 and 20-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. **Claims 1-2, 4-5, 13-14, 16-17, and 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Squire et al. US006057915A in view of Goldstein et al US 3,786,757.**

3. Referring to claims 1, 13, and 26-27, Squire discloses in figure 1 a transmitter 26 for transmitting a defined beam of eye safe laser energy (col. 4 lines 22-23); a receiver 28 for receiving reflected energy from the beam onto a detector having a two-dimensional array of detector elements (Abstract); and analyzing information in the received energy so as to track a projectile (see Abstract). Squire scans azimuthally 360° by rotating the scanner mirror 126; However Squire does not transmit a beam having an azimuth angle of 360°. Goldstein teaches a Ladar system which includes transmitting a beam having an azimuth of 360° using a cone reflector (17t) and detecting the reflection simultaneously using a cone reflector (17r) (see figures 1 and 4, col. 2 lines 33-66). It would have been obvious to modify Squire's system to replace the scanner/receiver mirror device with reflecting cones that covers 360° azimuth and does not require a motor like the mirror scanner; thereby, reducing the number of

components and power consumption. Further, the combination of Squire and Goldstein teaches forming a two-dimensional image representing a contiguous 360° azimuthal view on the detector.

4. Referring to claims 2, 4, 14, and 16, the combination of Squire and Goldstein teaches the elevation angle to be approximately 10 degrees (see Goldstein col. 5 lines 22-23). Further, the transmitter unit in Goldstein includes a cone reflector 17t which shows to emitting at an elevation of approximately 10^{o} (see figure 1, beams A and B). Further, it would have been obvious to design the cone reflector/receiver to receive transmit/receive beams an any desired elevation angles depending on the required coverage and direction.

5. Referring to claims 5 and 17, Squire teaches the receiving includes directing the reflected energy onto a detector having at least two-dimensional array of detector elements, each the detector element receiving reflected energy from a respective different direction (see Abstract, col. 3 lines 26-51).

6. **Claims 6-8, 18-20 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Squire et al. US006057915A in view of Goldstein et al US 3,786,757 and Sepp GB2219708 A.**

7. Referring to claims 6 and 18, Squire does not teach the analyzing unit includes detecting a Doppler shift in the received energy to obtain (velocity and direction data). Sepp teaches detecting Doppler shift to calculate velocity (pages 5-6, and figure 1). It

would have obvious to detect Doppler shift for accurate measurement of movement and velocity.

8. Referring to claims 7 and 19, Squire teaches the receiving includes directing the reflected energy onto a detector having at least two-dimensional array of detector elements, each the detector element receiving reflected energy from a respective different direction (see Abstract, col. 3 lines 26-51).

9. Referring to claims 8 and 20, Squire does not mention that the receiving unit includes directing onto the detector a reference beam (transmitted beam), so that energy from the defined beam mixes with energy from the reference beam in each the detector element to produce sum and difference frequencies. However, Sepp teaches a heterodyne-sensor which reads on the claimed "to produce sum and difference frequencies". It would have been obvious to modify Squire's system to include the heterodyne detection for it's good sensitivity and to obtain better S/N ratio.

10. Referring to claim 25, Squire discloses in figure 1 a transmitter 26 for transmitting a defined beam of eye safe laser energy (col. 4 lines 22-23); a receiver 28 for receiving reflected energy from the beam onto a detector having a two-dimensional array of detector elements (Abstract); and analyzing information in the received energy so as to track a projectile (see Abstract). Squire scans azimuthally 360° by rotating the scanner mirror 126; However Squire does not transmit a beam having an azimuth angle of 360°. Goldstein teaches a Ladar system which includes transmitting a beam having an azimuth of 360° using a cone reflector (17t) and detecting the reflection simultaneously using a cone reflector (17r) (see figures 1 and 4, col. 2 lines 33-66). It would have been

obvious to modify Squire's system to replace the scanner/receiver mirror device with reflecting cones that covers 360° azimuth and does not require a motor like the mirror scanner; thereby, reducing the number of components and power consumption. Further, Squire does not teach the analyzing unit includes detecting a Doppler shift in the received energy to obtain (velocity and direction data). Sepp teaches detecting Doppler shift to calculate velocity (pages 5-6, and figure 1). It would have obvious to detect Doppler shift for accurate measurement of movement and velocity. Further, the combination of Squire, Goldstein, and Sepp teaches forming a two-dimensional image representing a contiguous 360° azimuthal view on the detector.

11. **Claims 9, 12, 21, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Squire et al. US006057915A in view of Goldstein et al US 3,786,757, Sepp GB 2 219 708 A, and Chen et al US 20030189512A1.**

12. Referring to claims 9 and 21, Squire is silent about the circuits for filtering and FFT. However, including circuits for filtering and FFT processing would have to be necessary (inherent) in the presence of clutter and noises from other systems. Chen teaches a Ladar system [0037] including circuits 16,18 and 22 for filtering and FFT processing (see figure 1). It would have been obvious to modify Squire's system to include the filtering and FFT circuits to remove clutter and obtain better signal to noise ratio.

13. Referring to claims 12 and 24, As mentioned above (see rejection of claims 8 and 20), Sepp teach the heterodyne detection, which include a reference beam from the

laser generator, which is equivalent to the claimed defined beam (see figure 1 in Sepp). It would have been obvious to modify Squire's system to include the heterodyne detection for it's good sensitivity and to obtain better S/N ratio.

14. **Claims 10 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Squire et al. US006057915A in view of Goldstein et al US 3,786,757, Sepp GB2219708A, Chen et al US 20030189512A1 and Ruff et al. US006844924B2.**

15. Referring to claims 10 and 22. Squire is silent about the defined beam to include chirp modulation. Ruff teaches using chirp modulation (see Abstract). It would have been obvious to modify Squire's system to include the chirp modulation because it gives good accuracy for time of flight measurements as it only correlates well at a single well defined time of arrival. Additionally it can be detected when the received chirp level is well below the level of any random noise.

16. **Claims 11 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Squire et al. US006057915A in view of Goldstein et al US 3,786,757, Sepp GB2219708A, Chen et al US 20030189512A1 and Tachikawa US005579103A.**

17. Referring to claims 11 and 23, Squire is silent about configuring the defined beam to be modulated with a single frequency. However, modulation with a single frequency is very well known, for example amplitude modulation which uses a single frequency. Tachikawa teaches a rangefinder system, including transmitting a modulated signal with a single frequency (see col. 5 lines 1-6). It would have been

obvious to modify Squire's system to include the single frequency modulation to improve detection (signal-to-noise ratio), and also depending on the desired range of coverage.

Response to Arguments

Applicant's arguments with respect to claims 1-2, 4-5, 13-14, 16-17, and 24-27 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Isam Alsomiri whose telephone number is 571-272-6970. The examiner can normally be reached on Monday-Friday 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Tarcza can be reached on 571-272-6979. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Isam Alsomiri

April 2, 2007